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Office of Science  
and Technology

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Marine  
Recreational  
Information  
Program

# Addressing MRIP Peer Review Recommendations and Research into Potential Sources of Non-Sampling Error in the Program's Surveys

February 14, 2022

# Outline

## Part 1:

- Overview of MRIP design (focusing on APAIS and FES)
- Certification peer reviews and MRIP's response
- National Academies 2017 peer review and MRIP's response
- Research into possible sources of non-sampling error

## Part 2:

- Gulf red snapper non-sampling error sensitivity analysis

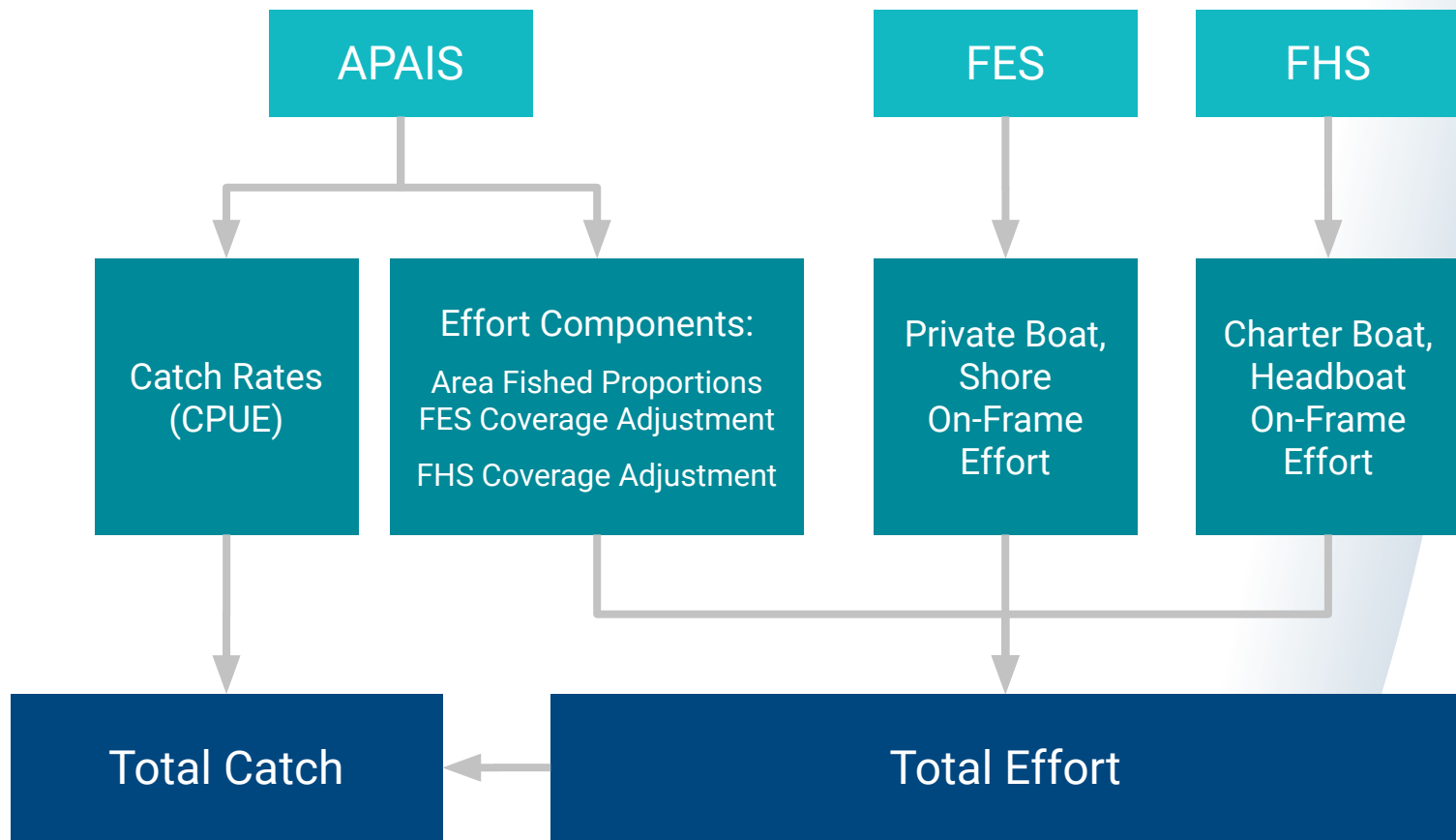


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# MRIP Surveys

## Component Estimates

## Primary Estimates



# Peer Reviews

## APAIS

- [Peer reviewed in 2012 and certified in 2013.](#)

## FES

- [Peer reviewed in 2014 and certified in 2015.](#)

## APAIS and FES

- [Peer reviewed again in 2017 by the National Academies of Sciences, Engineering and Medicine.](#)
  - Made comprehensive recommendations for all aspects of the program, including research into potential improvements to the survey, data collection and estimation designs.

Made [24 recommendations](#) in total regarding potential improvements and/or research.

To-date, nearly all recommendations from the above peer reviews are **actively being addressed**.

All peer reviews highlighted the **significant improvements** over the previous designs they were replacing.



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# Summary of APAIS Certification Peer Review Recommendations

General	Response from MRIP
Leveraging available technology to QC interview data.	Switch to tablet-based data collection in Atlantic (2019) and Gulf (2021).
Consideration of minor changes to design (e.g., not sampling 24 hours a day and splitting the sampling of high intensity sites).	Addressed in initial response to reviews: <ul style="list-style-type: none"><li>• Temporal stratification maintained based on pilot research.</li><li>• Clustering algorithm used to split sites into manageable sites that can be sampled in 6 hour assignments.</li></ul>

# Minor Changes made since Certification - APAIS

- Change to low activity site clusters from 3 sites to 2 in 2013
- New controlled sample selection approach implemented in 2013 to account for logistical constraints
- Adding a 'peak' time interval (11am-5pm) to the temporal stratification (accounted for in the sample weighting) in 2014
- Replacing fishing mode strata with site group strata to improve productivity of assignments in 2014



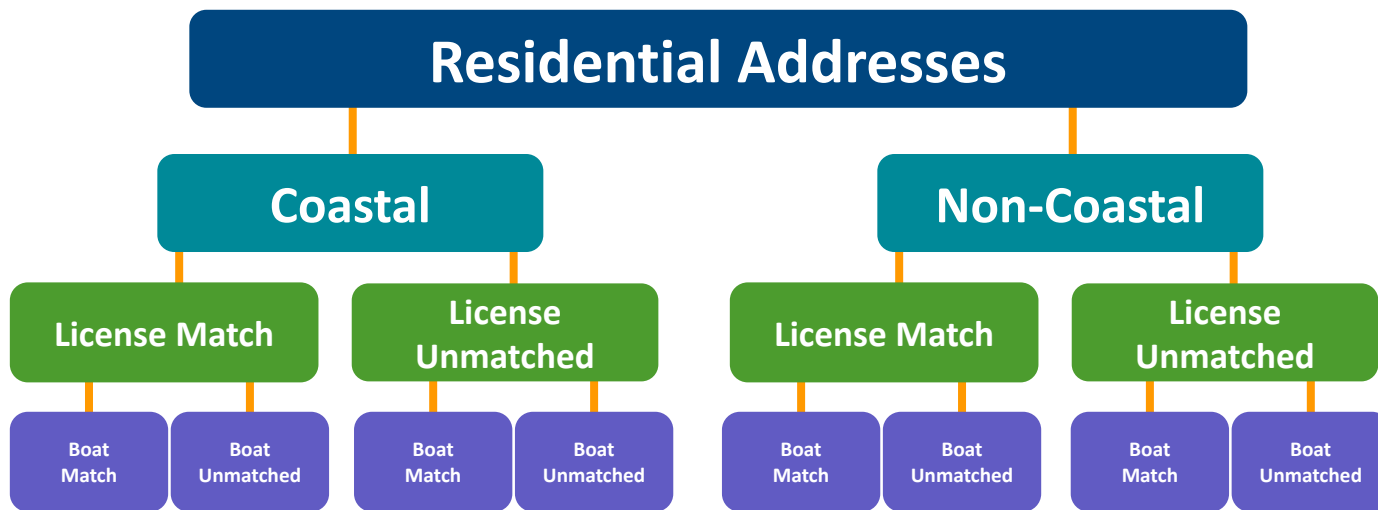
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# Summary of FES Certification Peer Review Recommendations

General	Response from MRIP
Identify variables that may correlate with both response propensity and reported fishing activity.	Investigated and added raking procedure to sample weighting process to account for them.

# Minor Changes made since Certification - FES

- Raking to enhance sample representativeness
- Improvement of non-response adjustment (added boat registration to the weighting classes)

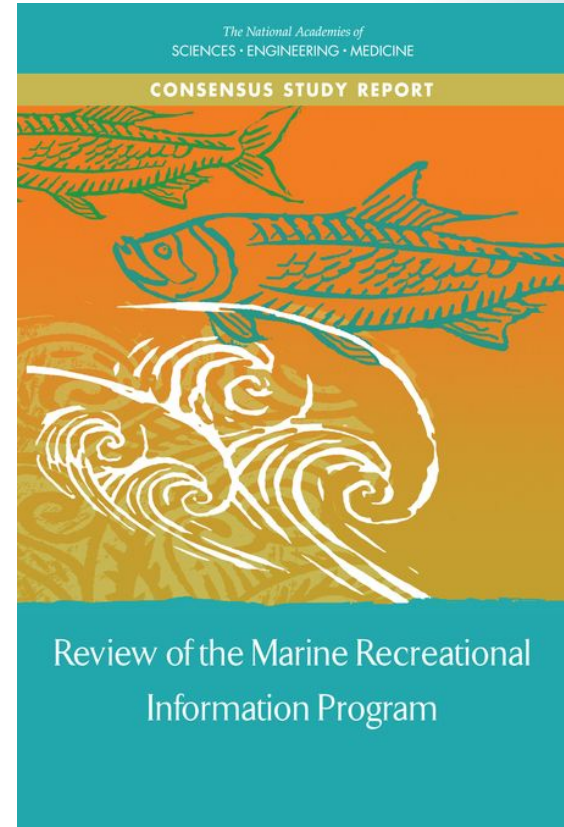




# Summary of 2017 National Academies Recommendations

16 recommendations to investigate potential improvements to the APAIS and FES, covering the following general topics:

- Investigate potential improvements to **estimation**.
- Investigate **electronic reporting** options and how to better **leverage technology** to improve data collection.
- Investigate potential sources of **non-sampling error**.



# MRIP Response to 2017 NASEM Review:

Investigate potential improvements to **estimation**.

- Improvements to FES weighting (2017 & 2018)
- Working to develop replication-based variance estimation procedures (2020-present).
- Rare event species working group analysis of various approaches to improve estimation for rare-event species (2020).



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# MRIP Response to 2017 NASEM Review:

Investigate **electronic reporting** options and how to better **leverage technology** to improve data collection.



- Switch to tablet-based interviewing for APAIS
- Research into app-based reporting:
  - [MRIP Research and Evaluation Team Review of the iAngler and iSnapper Reporting Programs](#) (2019)
  - [A Review of Nonprobability Sampling Using Mobile Apps for Fishing Effort and Catch Surveys](#) (2021)
- Research into electronic reporting options for FES:
  - [Testing a Web-Push Design for Estimating Recreational Fishing Effort](#) (2018)

# MRIP Response to 2017 NASEM Review:

Investigate potential sources of **non-sampling error**.

## AP AIS

- **Coverage error** (private access fishing)
  - Recreational Boat Fishing Survey Pilot Study (2021)
    - Examining private vs. public access area fished distributions (results expected in 2022)

## FES

- **Reporting and recall error**
  - [A comparison of recall error in recreational fisheries surveys with one- and two- month reference periods](#) (2015 - published in 2018)
  - Question order experiment (2019)
- **Non-response error**
  - [Non-response follow up study #1](#) (2014)
  - [Non-response follow-up study #2](#) (2018)
  - Two Sources of Nonsampling Errors in Fishing Surveys (chapter in a forthcoming in Springer Statistical Series publication)



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# Reporting and Recall Error

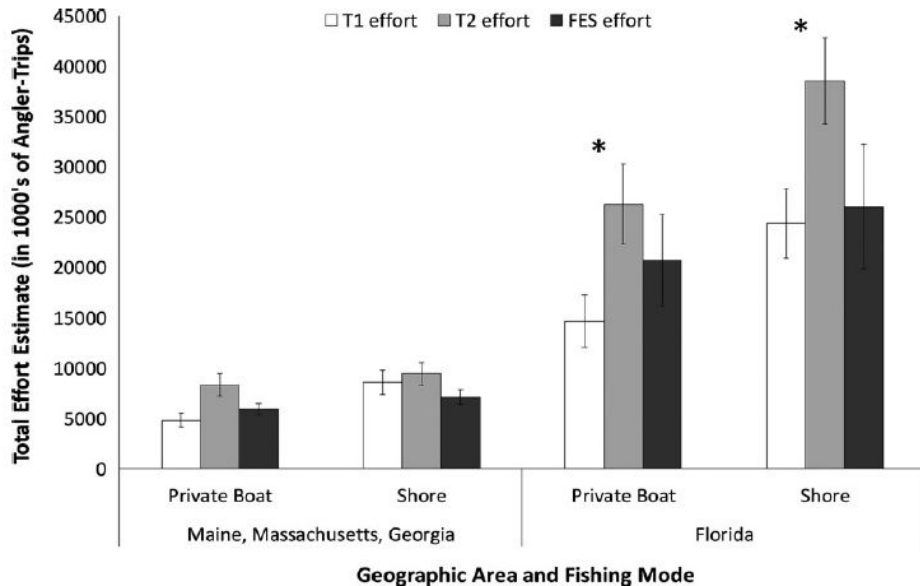
## One-Month Recall Study Experimental Design

Compared FES to two different designs for monthly estimates →

FES Questionnaire (Q's 15 and 16)	Treatment 1 Questionnaire (Q's 15 and 16)	Treatment 2 Questionnaire (Q's 15 and 16)
<p><u>Please think only about recreational saltwater fishing in &lt;Merged State&gt;.</u></p> <p><b>15</b> How many days did you go recreational saltwater fishing from the shore in &lt;Merged State&gt;? The shore includes docks, bridges, causeways, beaches, banks, or any other shore-based place or area.</p> <p><input type="checkbox"/> No shore recreational saltwater fishing in the last 12 months → <b>Go to question 16</b></p> <p><input type="text"/> Number of days in July and August of 2015</p> <p><input type="text"/> Total number of days in last 12 months</p> <p><b>16</b> How many days did you go recreational saltwater fishing from a private or rental boat that returned to shore in &lt;Merged State&gt;? Do not include charter boats or commercial boats that have a captain or crew who helped locate and catch fish.</p> <p><input type="checkbox"/> No private boat recreational saltwater fishing in last 12 months → <b>Go to Household Member 2</b></p> <p><input type="text"/> Number of days in July and August of 2015</p> <p><input type="text"/> Total number of days in last 12 months</p> <p><b>If you have more household members, continue to household member 2.</b></p>	<p><u>Please think only about recreational saltwater fishing in &lt;Merged State&gt;.</u></p> <p><b>15</b> How many days did you go recreational saltwater fishing from the SHORE in &lt;Merged State&gt;? The shore includes docks, bridges, causeways, beaches, banks, or any other shore-based place or area. Do not include freshwater fishing.</p> <p><input type="checkbox"/> Did not recreational saltwater fish from shore in the last 12 months → <b>Go to question 16</b></p> <p><input type="text"/> Number of days shore fishing in Jun. of 2015</p> <p><input type="text"/> Number of days in Jul. of 2015</p> <p><input type="text"/> Total number of days in last 12 months, including Jun. and Jul.</p> <p><b>16</b> How many days did you go recreational saltwater fishing from a private or rental BOAT that returned to shore in &lt;Merged State&gt;? Do not include charter boats or commercial boats where a paid captain or crew helped locate and catch fish.</p> <p><input type="checkbox"/> Did not recreational saltwater fish from private boat in last 12 months.</p> <p><input type="text"/> Number of days boat fishing in Jun. of 2015</p> <p><input type="text"/> Number of days boat fishing in Jul. of 2015</p> <p><input type="text"/> Total number of days boat fishing in last 12 months, including Jun. and Jul.</p> <p><b>If you have more household members, continue to household member 2.</b></p>	<p><u>Please think only about recreational saltwater fishing in &lt;Merged State&gt;.</u></p> <p><b>15</b> How many days did you go recreational saltwater fishing from the SHORE in &lt;Merged State&gt;? The shore includes docks, bridges, causeways, beaches, banks, or any other shore-based place or area. Do not include freshwater fishing.</p> <p><input type="checkbox"/> Did not recreational saltwater fish from shore in the last 12 months → <b>Go to question 16</b></p> <p><input type="text"/> Number of days in Jul. of 2015</p> <p><input type="text"/> Total number of days in last 12 months, including Jul.</p> <p><b>16</b> How many days did you go recreational saltwater fishing from a private or rental BOAT that returned to shore in &lt;Merged State&gt;? Do not include charter boats or commercial boats where a paid captain or crew helped locate and catch fish.</p> <p><input type="checkbox"/> Did not recreational saltwater fish from private boat in last 12 months.</p> <p><input type="text"/> Number of days boat fishing in Jul. of 2015</p> <p><input type="text"/> Total number of days in last 12 months, including Jul.</p> <p><b>If you have more household members, continue to household member 2.</b></p>

# Reporting and Recall Error (cont'd)

## One-Month Recall Study: Key Findings



- **No significant differences between the FES and experimental survey estimates**
  - Suggests the FES may not suffer from omission error.
- **Systematic differences in our experimental treatments**
  - Suggests possible telescoping error with the one month reference period (that could be mitigated by including multiple reference periods in a single questionnaire).

# Reporting and Recall Error (cont'd)

## Web-Push Findings Leading to Question Order Study

Web-push **estimates were systematically lower** than the FES estimates.

Survey Measure	FES	Web Push	Difference	p-value
Boat Prevalence (%)	4.4	3.76	0.64	0.267
Mean Boat Fishing Days per Household	4.86	4.03	0.83	<b>0.0364</b>
Shore Prevalence (%)	5.76	4.42	1.34	<b>0.0025</b>
Mean Shore Fishing Days per Household	6.01	5.15	0.86	0.1287

FES question order asking about fishing trips:

1. Number of days in Month 1 and month 2.
2. Number of days in last 12 months.

Web push question order asking about fishing trips:

1. Number of days in last 12 months.
2. Number of days in Month 1 and Month 2.



# Reporting and Recall Error (cont'd)

## Question Order Study: Experimental Design

FES: SH:PR/2:12

**15** How many days did you go recreational saltwater fishing from the SHORE in North Carolina?

The shore includes docks, bridges, causeways, beaches, banks, or any other shore-based place or area. Do not include freshwater fishing.

☐ Did not recreational saltwater fish from shore in last 12 months → Go to question 16

Number of days saltwater shore fishing in January and February of 2018

Number of days saltwater shore fishing in last 12 months, including January and February

**16** How many days did you go recreational saltwater fishing from a private or rental BOAT that returned to shore in North Carolina?

Do not include freshwater trips or trips where a paid captain or crew helped locate and catch fish.

☐ Did not recreational saltwater fish from private boat in last 12 months

Number of days saltwater boat fishing in January and February of 2018

Number of days saltwater boat fishing in last 12 months, including January and February

EXP1: SH:PR/12:2

**15** How many days did you go recreational saltwater fishing from the SHORE in <<statefull>>?

The shore includes docks, bridges, causeways, beaches, banks, or any other shore-based place or area. Do not include freshwater fishing.

☐ Did not recreational saltwater fish from shore in last 12 months → Go to question 16

Number of days saltwater shore fishing in last 12 months

Number of days saltwater shore fishing in <<relperiod2>>

**16** How many days did you go recreational saltwater fishing from a private or rental BOAT that returned to shore in <<statefull>>?

Do not include freshwater trips or trips where a paid captain or crew helped locate and catch fish.

☐ Did not recreational saltwater fish from private boat in last 12 months

Number of days saltwater boat fishing in last 12 months

Number of days saltwater boat fishing in <<relperiod2>>

EXP2: PR:SH/2:12

**15** How many days did this person go recreational saltwater fishing from a private or rental BOAT that returned to shore in North Carolina?

Do not include freshwater trips or trips where a paid captain or crew helped locate and catch fish.

☐ Did not recreational saltwater fish from private boat in last 12 months → Go to question 16

Number of days saltwater boat fishing in November and December of 2019

Number of days saltwater boat fishing in last 12 months, including November and December

**16** How many days did this person go recreational saltwater fishing from the SHORE in North Carolina?

The shore includes docks, bridges, causeways, beaches, banks, or any other shore-based place or area. Do not include freshwater fishing.

☐ Did not recreational saltwater fish from shore in last 12 months

Number of days saltwater shore fishing in November and December of 2019

Number of days saltwater shore fishing in last 12 months, including November and December

EXP3: PR:SH/12:2

**15** How many days did you go recreational saltwater fishing from a private or rental BOAT that returned to shore in North Carolina?

Do not include freshwater trips or trips where a paid captain or crew helped locate and catch fish.

☐ Did not recreational saltwater fish from private boat in last 12 months → Go to question 16

Number of days saltwater boat fishing in last 12 months

Number of days saltwater boat fishing in November and December of 2019

**16** How many days did you go recreational saltwater fishing from the SHORE in North Carolina?

The shore includes docks, bridges, causeways, beaches, banks, or any other shore-based place or area. Do not include freshwater fishing.

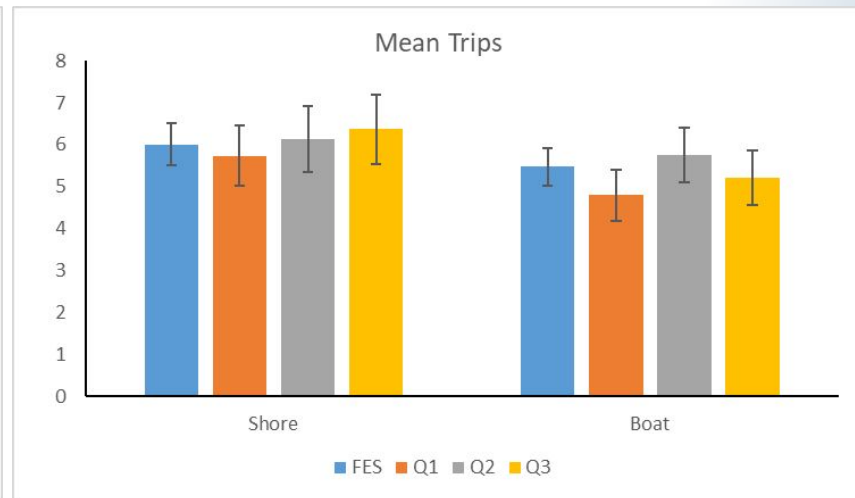
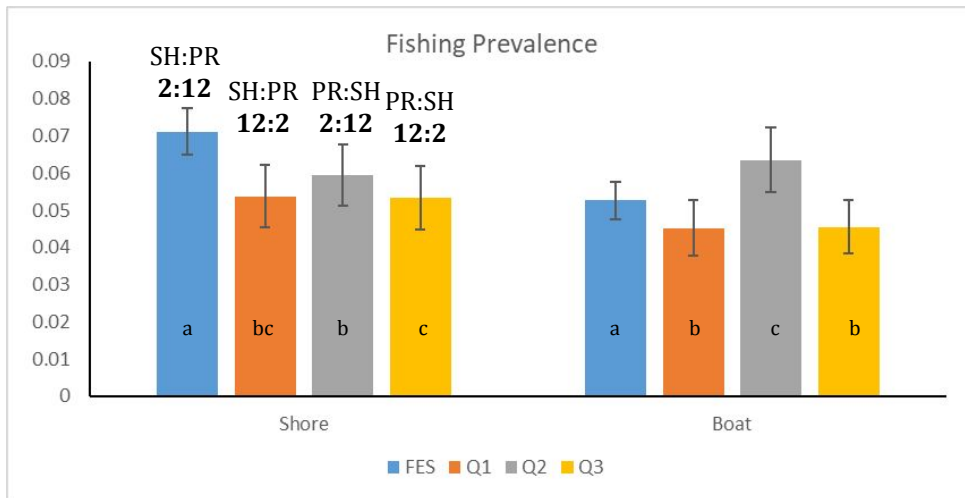
☐ Did not recreational saltwater fish from shore in last 12 months

Number of days saltwater shore fishing in last 12 months

Number of days saltwater shore fishing in November and December of 2019



# Reporting and Recall Error: Question Order Study Key Findings



- Limited impact of changing the order of private boat and shore fishing questions.
- Asking the 2 month question first and 12 month question second resulted in **higher estimates of fishing prevalence** than asking the 12 month question first and the 2 month question second.

# Non-Response Error

## Key Findings from Non-Response Studies

Households that responded to the FES, after additional contact attempts and a larger incentive, were **not significantly different from base respondents**.

Results from 2021 Study:

Household/Population Attribute	FES			FES+		
	Selection Weights	Final Weights	Relative Difference (%)	Selection Weights	Final Weights	Relative Difference (%)
Households with Boat Fishing (%)	7.8	6.7	13.5	7.5	6.5	13.8
Mean Boat Fishing Days per Household	7.6	6.8	10.1	7.5	7.0	6.8
Households with Shore Fishing (%)	9.1	8.4	8.0	8.9	8.2	8.2
Mean Shore Fishing Days per Household	8.7	8.5	2.0	8.4	8.3	0.8



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**Questions before moving onto Part 2?**



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